

REMARKS

Claims 12, 13 and 15-25 stand rejected under 35USC102(b) as being anticipated by Gutleber '999. The applicant respectfully disagrees with these rejections for the following reasons.

With regard to claim 24, the applicant submits that step c), involving cyclically alternating execution of steps a) and b), as well as the corresponding feature of device claim 25 are not disclosed by the '999 reference. In arguing the rejection, the examiner states that step c) is disclosed in column 3, lines 4-19 of the '999 reference. The applicant submits that this section of the '999 reference provides no motivation for cyclic alternation of the partial antennas. In particular, a reference must be evaluated in its entirety and other portions of the disclosure of the '999 reference are therefore essential in order to achieve a balanced evaluation of the actual manner of operation of the '999 reference. However, such an evaluation clearly shows that step c) of method claim 24 is missing from the '999 reference for the following reasons.

The '999 reference provides for simultaneous operation of two partial antenna systems. Referring, in particular, to Fig. 1 of the '999 reference, that figure displays no means for switching from operation of the first antenna system (e.g. the omni-directional antenna) to operation of a second partial antenna (e.g. the antenna having the notch 10). Referring to the associated description of figure 1 in the '999 reference at column 2, lines 34-40 it is stated:

"The output of the notch antenna 10 (channel A) is orthogonally multiplexed with the output of an omnidirectional antenna 12 (channel B),

with the multiplexing being of time, frequency or space method so long as signals from the antennas 10, 12 are rendered non-interfering with each other".

Expressed in equivalent language, the orthogonal overlap prevents interference between the two received signals of the antennas 10 and 12. Conversely, this dictates that the two antenna systems, absent the orthogonal multiplexing, would interfere with each other when conjoined upstream of receiver 16. However, this can only be the case if both signals are present at the same time. In other words, the received signals of the two antennas 10 and 12 of figure 1 of the '999 reference are simultaneous in time. This simultaneous presence of the system signals of the '999 reference excludes the operation method recited in feature c) of claim 24, since that step requires alternating or non-simultaneous operation of the two antennas 10, 12.

The examiner's attention is also referred to figure 5 of the '999 reference in which only one antenna is shown, consisting of antenna elements 100, 200, 300...N. The output signals of these antenna elements 100, 200, 300...N are simultaneously processed in a first branch (adder 50) as well as in a second branch (adder 60). Towards this end, the signals of the antenna elements 100, 200, 300...N are directly added in adder 50. In so doing, a notch antenna pattern (80 in figure 6) is produced. The adder 60 adds the signals of the antenna elements 100, 200, 300...N with respective proper phase shifts Θ , 2Θ , 3Θ ... $N\Theta$. In this fashion, a "scanned notch antenna pattern" (No. 82 in figure 6) is produced. The simultaneously produced patterns 80 and 82 are subtracted from each other in block 70 of figure 5. The signal processing is carried in parallel and thereby simultaneously in the adders 50 and 60, which clearly precludes the cyclic alternate operation of two

antenna systems as required by the recitations of feature c) in claim 24 of the instant invention.

Moreover, figure 5 only shows one single antenna, which consists of the antenna elements 100, 200, 300...N. These antenna elements 100, 200, 300...N co-operate to constitute a continuously operated overall antenna system. In order to be able to subtract the signals which are received during simultaneous operation of this system, it is necessary for the signals to be coherent and therefore have a fixed phase relationship with respect to each other. Towards this end, the '999 reference provides for amplitude and phase adjustment circuits 22, 24 (see figure 1, column 2, lines 56-63 of the '999 reference).

In contrast thereto, and in contrast to figure 5 of the '999 reference, the antenna configuration 100 in accordance with the invention (see for example figure 1) has a first antenna system comprising individual patches 110-1 to 110-6 as well as a second antenna system which, in the embodiment of figure 1, consists essentially of patches 110-1 to 110-6 together with the switched second antenna elements 110-7 to 110-12. The switching-in of the second antenna elements 110-7 to 110-12 is effected by means of the switching device 130b. In the first operation mode in which only the first antenna system is operated, only antenna elements 110-1-110-6 are activated. Alternative thereto, the second partial antenna is operated e.g. in cyclic alternation with respect to the first partial antenna, (see the instant application second paragraph on page 4). Therefore, in accordance with the invention, the signals are received from the differing partial antennas at different times and are subsequently subtracted from each other. The signals, detected in sequence, are necessarily non-coherent since their mutual phase relationship is irrelevant.

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By means of the cyclical alternation (separated in time with respect to each other), the method in accordance with the invention simply records whether or not operation is proceeding with the first partial antenna (without notch) having a signal (with a certain amplitude or intensity) and/or whether or not such a signal also occurs during the subsequent operation with the second partial antenna. Such a signal occurs during operation of the first partial antenna and during operation of the second partial antenna if and only if the signal source is in the common field of view of both antenna system (e.g. in the event that the antenna configuration is part of a radar sensor). If one considers S_1 the signal received from the first partial antenna (amplitude and corresponding operation phase received signal energy...) and S_2 the signal received from the second antenna system, then S_1 is approximately equal to S_2 and $S_1 - S_2$ is approximately zero. In other words, when the signals S_1 and S_2 are subtracted, zero results. The overall signal is thereby not seen by the antenna configuration and therefore not registered.

If however, such a signal occurs within the narrow notch region it is only seen (as signal S_1) by the first antenna system, since the notch essentially constitutes a blind spot in the field of view of that second antenna. S_2 is therefore approximately zero. In this case, the difference $S_1 - S_2$ is equal to $S_1 - 0$ is equal to S_1 . In other words, the contribution which differs from zero causes an overall signal, which is seen by the antenna configuration and registered. This result also shows that the signal comes from the region of the narrow notch so that the antenna system in total has a very narrow field of view. This narrow field of view is achieved in accordance with the invention with very simple measures.

Although a similar result is achieved by '999 patent, this result is achieved in a manner deviating from the requirements of step c) of method claim 24. The subtraction of coherent signals is affected by the '999 patent using a procedure which is substantially more difficult (see for example the block diagram including amplitude adjustment and phase adjustment of figure 1 in the '999 disclosure). The simplicity of the invention is due to the cyclic alternation between the first operation mode in which the first partial antenna is active and a second operation mode in which the second partial antenna is active. This contrasts with the '999 system with which the partial antennas 10, 12 of figure 1 are always operated simultaneously. This simultaneous operation requires that the extremely rapidly fluctuating and phase sensitive signals be adjusted in such a fashion that their phases are identical or at least such that a pre-defined relative phase obtains during the subtraction procedure. In accordance with the invention, such rapidly fluctuating phase signals associating with simultaneously received signals do not impose additional problems, since the subtraction procedure occurs in sequence in separate operating phases between the first partial antenna and the second partial antenna received signal amplitudes. The solution in accordance with the invention is therefore characterized by extreme simplicity and stability and is also less expensive to produce and operate than the relatively complicated solution in accordance with the '999 proposal.

The dependant claims of record inherit the limitations of the base claims and are therefore similarly distinguished from the '999 disclosure for the reasons given. The applicant therefore submits that the invention is neither anticipated by nor obvious in view of the prior art of record and consequently requests passage to issuance.

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Respectfully submitted,

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